

# Development, Evaluation and Results of a Yearly Enrichment Plan in Bottlenose Dolphins (*Tursiops truncatus*)

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**Abstract:** The development and implementation of an enrichment plan allows for better welfare in controlled environments, promoting natural behaviors and reducing behaviors associated to captivity.

An enrichment plan for Bottlenose Dolphins started in Mundomar in 2014, in a group of 4 males and 6 females, with ages varying between 1 and 36 years.

The enrichment devices were developed, constructed and evaluated. A total of 42 devices were newly made, not bought, and made available to the animals during the year. The final objective was to create a catalogue with all the available devices once evaluated, classified by types of environmental enrichment.

Evaluation of the set goals for each device was done through visual observations. Types of enrichment were differentiated using a color code, as well as the responses or attitudes obtained from the animals. The final evaluation produced a list of recommendations per individual or for the entire group, based on the success of each individual enrichment device.

Enrichment is used currently as another reinforcement tool during animal training. An increase in the number of interactions with the enrichment items and in the expected responses of the animals has contributed to a better health status of the dolphins this past year.

**Key words:** enrichment plan in dolphins, environmental enrichment, dolphin's welfare, enrichment as reinforcement

## 1. Introduction

Enrichment means providing captive animals the opportunity to express their natural behaviour's physically and psychologically, modifying their environment

## 2. Goals

Some of the most important goals in an environmental enrichment plan are:

- To improve animal welfare.
- Encourage natural behaviours.
- Reduce stress, aggression and stereotypic behaviour's.

-Provide opportunities for the animals to face challenges in a natural way.

-To educate, explain and teach our visitors about the species biological needs.

-Assess the animal's health status by noting abnormal behaviour when conducting enrichment with them.

-Use enrichment as a training tool.

## 3. Material

In our dolphinarium there's a group of ten bottlenose dolphins with an age range between 2 to 40 years. The group is formed by six females, three adults, two juveniles and an elderly one, as well as by four males, one breeding male, two juveniles and a two year old calf.

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The program began with the development of 8 Enrichment devices. As time passed more were created, reaching a total number of 42 ED by the end of last year.

The data was entered into a spreadsheet and analysed on a monthly basis.

### 4. How to Establish and Enrichment Plan

Usually an enrichment program follows determined steps, steps that we didn't follow completely. Our set-up was as follows:

#### (1) Creation and Testing of Enrichment Devices (ED)

The program began with the development of 8 enrichment devices. The devices were created by us, using recycled materials. The potential danger was assessed before use, always in strong collaboration with the veterinary department.

#### (2) Data collection

Staff recorded the reactions and behaviour's on an individual basis. Also the time, place and duration of the session were recorded.

#### (3) Evaluation of the plan

The information was written in a spreadsheet for its future evaluation and assessment.

With the conclusions we were able to establish appropriate recommendations for the following month

#### (4) Planning

Thanks to the information acquired through the observations, monthly schedules could be established.

#### (5) Readjustment

The readjustment and monthly plans allowed a greater balance and variability in the types of enrichment.

#### (6) Research species and set goals

The plan started without a specific purpose and as it developed, the goals were defined.

### 5. Enrichment Catalogue

The different types of enrichment were classified according to a color code.

SOCIAL	PHYSICAL	HABITAT/STRUCTURAL	SENSORY	FOOD	COGNITIVE
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We established a sixth category that we called physical enrichment, aimed to increase the amount of physical exercise performed by our animals.

Enrichment devices were evaluated individually.

A catalogue was created in which each Enrichment device was classified according to the type of enrichment it belonged to.

Each file in the catalogue has the following headings:

- Enrichment device name
- Enrichment type
- Description
- Material used
- The goals to be reached
- Two photos; one where the animal's interaction is seen and another one of the Enrichment device
- Success rate
- Evaluation of the Enrichment device
- Any other observations

ELEMENTOS DE ENRIQUECIMIENTO	
ELEMENTO DE ENRIQUECIMIENTO	ALGAS -39-
TIPO DE ENRIQUECIMIENTO	ENRIQUECIMIENTO ESTRUCTURAL
DESCRIPCIÓN ELEMENTO	ALGAS HECHAS CON TUBO FLEXIBLE DE ASPIRACIÓN, CUERDA Y TELA DE FIELTRO.
MATERIALES	CUERDA, FIELTRO, TUBERÍA DE ASPIRACIÓN Y PLUMOS DE BUCEO
OBJETIVOS ELEMENTO	QUE INTERACTÚEN CON EL MORRO O CUALQUIERA DE SUS ALETAS QUE NADEN ENTRE LAS ALGAS
FOTO	
	
PORCENTAJE DE ÉXITO	62%
VALORACIÓN	De los elementos con mayor índice de éxito por el número de sesiones analizadas.
OBSERVACIONES	Hay que destacar de manera positiva las reacciones de Camino, Mattie, Aqua y Eduardo

## 6. Monthly enrichment plan

Planning sheets are done monthly with the following headings:

- Date
- Time of the session

- Chosen enrichment device
- Observations
- Duration of the enrichment

Observations are written in a notebook to describe the interactions in more detail.

ENRIQUECIMIENTO AMBIENTAL DELFINES 2015				
FECHA	HORA	ACTIVIDAD	OBSERVACIONES	TIEMPO
02/07/2015		Túnel del sueño (NUEVO)		
03/07/2015		Círculos de conchas		
04/07/2015		Algas		
05/07/2015		Pelotas azules grandes		
06/07/2015		Entrenadores con matts		
07/07/2015		Lluvia de pescado		
08/07/2015		Cepillos en superficie		
09/07/2015		Entrenadores con matts		
10/07/2015		Sonidos de la naturaleza (NUEVO)		
11/07/2015		Botes proteínas con 5 sprats dentro		
12/07/2015		Átomo hundido a media altura		
13/07/2015		Burbujas de aire (botella de buceo)		
14/07/2015		Piñata de pescado (NUEVO)		
15/07/2015		Círculos de conchas		
16/07/2015		Lluvia de agua con la manguera en Calamares		
17/07/2015		Entrenadores con matts		
18/07/2015		Algas		
19/07/2015		Nada		
20/07/2015		Lluvia de pescado		
21/07/2015		Pelotas azules grandes		
22/07/2015		Algas		
23/07/2015		Hielo con pescado con forma de bote		
24/07/2015		Sonidos de la naturaleza (NUEVO)		
25/07/2015		Túnel del sueño (NUEVO)		
26/07/2015		Nada		
27/07/2015		Piñata de pescado (NUEVO)		
28/07/2015		Túnel del sueño (NUEVO)		
29/07/2015		Sonidos de la naturaleza (NUEVO)		
30/07/2015		Entrenadores con matts		
31/07/2015		Espejos		

## 7. Rating Scale

A rating scale of possible reactions to the enrichment was established. Classifying the answers into 6 groups, each group was then assigned a different colour.

If an animal was not present during the enrichment session it was also noted.

	ANIMAL ATTACKS ED, IS AFRAID OF THE ED, IS STRESSED BY THE ED
	NO REACTION
	NOT EXPECTED REACTION
	ANIMAL NOTICES THE ED BUT DOESNT INTERACT WITH IT
	EXPECTED REACTION BUT NOT EXPECTED INTERACTION TIME
	EXPECTED REACTION
	THE ANIMAL IS NOT IN THE POOL

## 8. Spreadsheet Analysis

The information collected during a month's time was evaluated and introduced into a spreadsheet.

In the spreadsheet we can see:

- the date
- the time
- the Enrichment device
- the type of enrichment
- And the response of each animal

This way we could get:

- Success rates of expected responses for each enrichment device
- The amount of responses of each type in the animals
- Monthly rate of expected responses

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Date	Time	Element	Type of enrichment	Team	Aqua	Camino	Eduardo	Farah	Jade	Julito	Leah	Mattie	Maya	Expected interactions	Interactions	Element success
01/06/2015	19:34	MIRROR	Sensory enrichment											7	8	87.50%
02/06/2015		Algae	Structural enrichment											8	8	100.00%
03/06/2015		TRAINERS IN THE WATER	Social enrichment											8	8	100.00%
04/06/2015	10:17	FITNESS BALL	Edú enrichment											7	10	70.00%
05/06/2015	12:17	FISH INSIDE PLASTIC JAR WITH HOLES	Food enrichment											4	10	40.00%
06/06/2015	16:43	RAIN WITH HOSE MOVING	Sensory enrichment											2	8	25.00%
07/06/2015	17:24	ROPE ON THE BOTTOM	Edú enrichment											6	6	100.00%
08/06/2015	17:19	ATOM ON SURFACE	Edú enrichment											8	2	8.00%
09/06/2015	18:55	ALGAE	Structural enrichment											6	10	60.00%
10/06/2015	17:10	ICE WITH FISH	Food enrichment											8	10	80.00%
11/06/2015	11:52	ATOM IN THE BOTTOM	Edú enrichment											5	7	71.43%
12/06/2015	19:19	TRAINERS IN THE WATER	Social enrichment											9	10	90.00%
13/06/2015														2	2	100.00%
14/06/2015		MIRROR	Sensory enrichment											5	6	83.33%
15/06/2015		FISH INSIDE PLASTIC JAR WITH HOLES	Food enrichment											4	8	50.00%
16/06/2015		RAIN FISH	Food enrichment											10	10	100.00%
17/06/2015		SCUBA BUBBLES	Sensory enrichment											1	10	10.00%
18/06/2015		RAIN WITH FOED HOSE	Sensory enrichment											3	10	30.00%
19/06/2015		BOAT BUOYS	Edú enrichment											8	8	100.00%
20/06/2015		Nada														
21/06/2015		FITNESS BALL	Edú enrichment											8	8	100.00%
22/06/2015		TRAINERS IN THE WATER	Social enrichment											8	10	8.00%
23/06/2015		Nada														
24/06/2015		RAIN FISH	Food enrichment											7	8	
25/06/2015		ROPE ON THE SURFACE	Edú enrichment											6	8	75.00%
26/06/2015		Nada														
27/06/2015		Nada														
28/06/2015		Nada														
29/06/2015		Nada														
30/06/2015		ICE WITH FISH	Food enrichment											8	10	80.00%
				INTERACTIONS	14	19	21	22	29	28	21	21	21	14		
					0	0	0	0	0	0	0	0	0	0		
					0	2	2	2	1	1	4	1	2	1		
					0	1	0	0	1	0	0	0	0	0		
					5	2	3	5	1	2	3	4	4	5		
					2	0	2	2	0	2	2	0	2	2		
					0	0	0	2	1	1	2	1	2	1		
					5	11	10	11	16	16	16	15	11	17		
				Asesora	17	12	10	9	11	11	10	10	10	17		
				SUCCESS PERCENTAGE	64.29%	68.42%	76.19%	59.09%	80.00%	80.00%	57.14%	71.43%	61.90%	50.00%		

## 9. Conclusions

The conclusions we have drawn are the following:

-We have noticed diseases through the animal's reactions to enrichment.

-We know the favourite enrichment devices for all the animals.

-We know the animal's preferences towards enrichment types.

-Dominant animals show less interest in enrichment.

-When new ED are used, the number of interactions decrease until animals are desensitized towards the devices.

-Desensitization time towards new ED has decreased over time.

-Younger animals show a greater interest in enrichment.

-The use of enrichment as secondary reinforcement after a training session is very positive.

-Social problems have decreased, as well as dominance problems.

-It is necessary to have enough ED for each animal.

## References

- [1] Halit Khoshen, Enriquecimiento y Bienestar de Mamíferos en Cautiverio. Manual para Centro y Sur América
- [2] G. Kleinman, K. Thomson and C. Kirk Baer, *Wild Mammals in Captivity: Principles and Techniques for Zoo Management*.
- [3] Ramírez Ken, *Animal Training: Successful Animal Management through Positive Reinforcement*.
- [4] Robert J. Young, *Environmental Enrichment for Captive Animals*.